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ABSTRACT

Included is a set of five teacher-prepared Learning Activity Packages (LAPs) for individualized instruction in topics in biology. The units cover the topics of individuals and populations, communities and ecosystems, diversity, plant functions, and animal functions. Each unit contains a rationale for the material; a list of behavioral objectives for the unit; a list of resources including texts (specifying reading assignments) and visual materials; activities, including laboratories when appropriate; a depth study; and a self-evaluation test. For other documents in this series, see SE 016 428. (JR)

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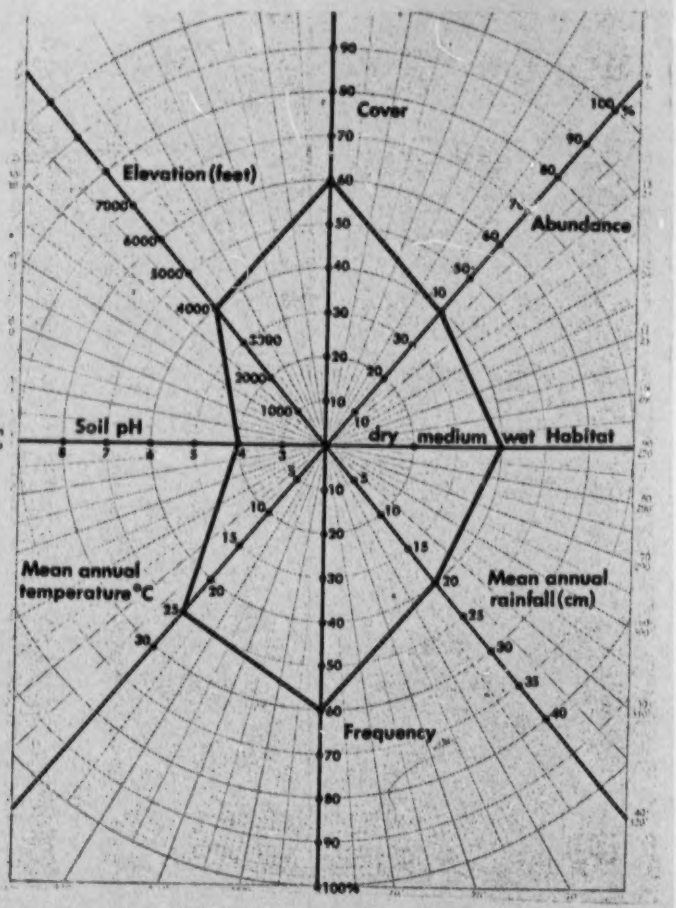
LEARNING ACTIVITY PACKAGE



INDIVIDUALS AND POPULATIONS

Ninety Six High School
Ninety Six, S.C.

BIOLOGY 103-104

REVIEWED BY _____

LAP NUMBER 12

WRITTEN BY Bruce Rhoden

SE 016 421

2

102271

Rationale

Most students are aware of the fact that plants and animals, exits. This LAP is the first in a series on the study of how living organisms relate to one another and to their environment. You will study the individual and how individuals of the same species interrelate within a unit called a population. In the next three LAPs you will examine terrestial population aquatic and the interactions which affect them.

Section I

Behavioral Objectives

After consulting the resources you will:

1. Identify a description of population from a given list.
2. Predict the results of a given situation leased upon Malthers "... principle of population..."
3. Calculate the density given the number of individuals and the dimensions of the ares.
5. Calculate the rate of density change, given the description of the population and one or more determiners of population density.
6. Describe a situation in which mortality, natality, immigration and/or emigration determine the population's density.
7. List at least five environmental factors and how they might affect population density.
8. Identify all major parts of a microscope given a microscope or an illustration of one.
9. Demonstrate your knowledge of the proper use of the light microscope by preparing a wet mount of yeast and after focusing on the lower powers, you will focus on at least 400 power.

Resources

Readings and Problems

High School Biology (Green version) pp. 36-56, 11-18

Life Its Forms and Changes - Branduiein pp. 525-528

Biological Science molecules to man (Blue version) pp. 21-24, 695-696

Visuals

Filmstrip- "Insect Ecology"

Laboratory "Study of A Yeast Population" B.S.C. Green p. 53

Depth Study

After reading "Population Control in Animals" scientific American vol. 5 p 1693 you will write a summary of its contents and if so instructed will present a brief oral report to the class.

Self Test

1. Choose the statements below which best illustrates an example of a population description.

   (a) the rabbits in Greenwood county

   (b) the rats in South Carolina in August 1956

   (c) red foxes

   (d) the fish in the Red Sea

2. Calculate the density of the following population.

   A biology student was studying ecology and found that in September 1964 there were 500 White Daks (Quercus Alba) in an area which measured 130.5 yards by 10.2 yards._____

3. One year after the above study another biology student found the density to be 3.66 per square yard. Calculate the rate of density change.

4. List Three factors which might affect the density of a population.

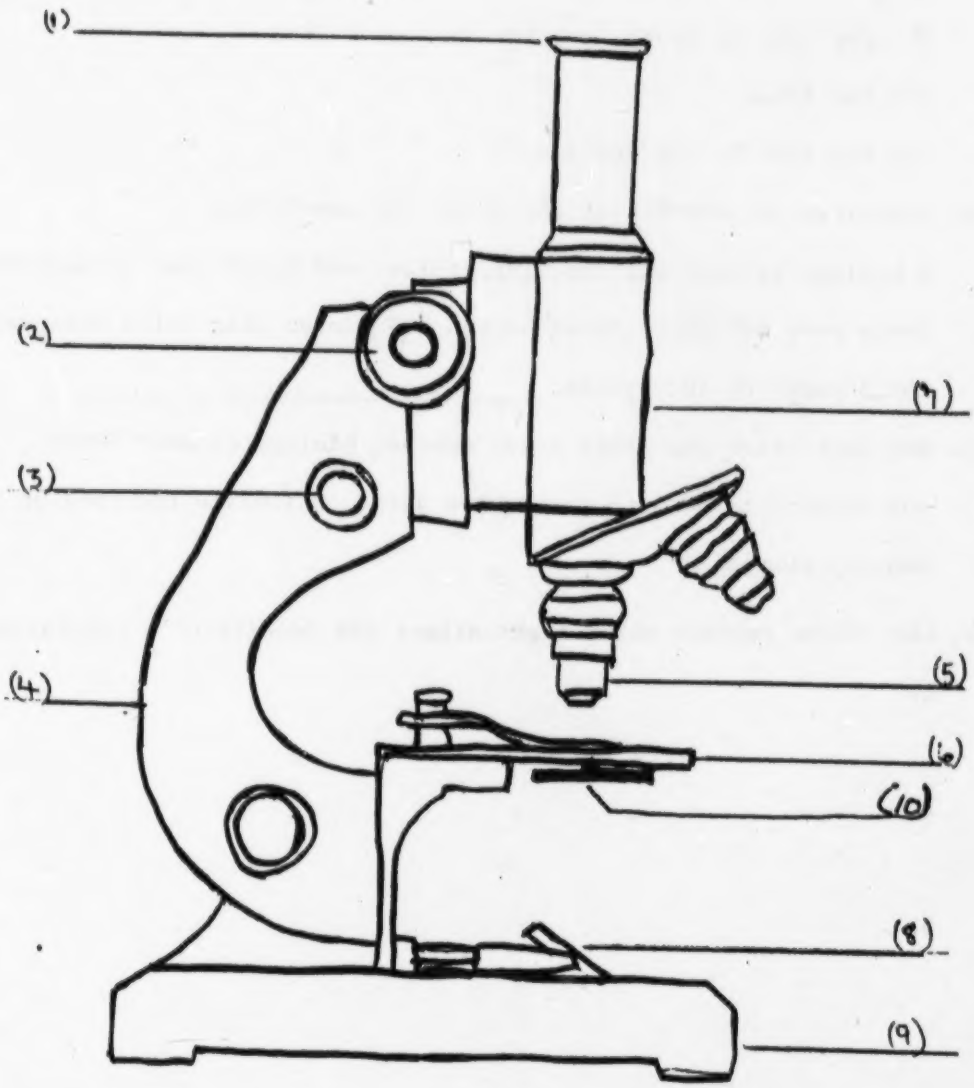
   1.

   2.

   3.

Self Test Cont.

5. Label the indicated parts.



Take Progress Test

Section II

Behavioral Objectives

10. Contrast the population density trends in an open system to that of a closed system, and explain why they differ.
11. Describe how a steady state is maintained in an open population.
12. Based upon your understanding of population growth patterns you will describe orally or in writing how environmental factors tend to prevent most populations either from becoming very large or from disappearing.
13. List the characteristics two or more organisms must have to be considered the same species.
14. Describe at least three factors which prevent two species from interbreeding and becoming one.

Resources.

Readings and Problems

High School Biology(BSCS Green) pp. 56-70

Biology Introduction to life- pp. 698-703, 741-748

Biological Science- Molecules to Man (Blue version) pp. 678-696

The Biological Sciences- pp. 516-422, 60-61

Visuals:

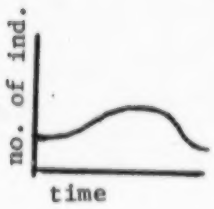
Filmstrip- "Homeostatic Regulation"

Laboratory- "Population Changes in Open Systems" High School Biology-- Inv. 2.3 page 62

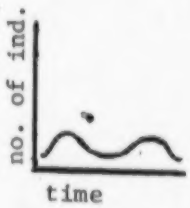
Self Test

1. Which of the graphs below best represent the population density trend in a closed population?

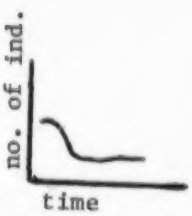
A.



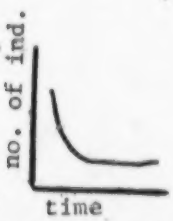
C.



B.



D.



2. List two factors which work in maintaining steady state.

3. A horse and a donkey can make and produce offspring(The mule) The mule can not reporduce. Are the two organisms of the same on different species?

4. List one factor which prevents two species of interbreeding and becoming one.

Answer to Self-Test

Section I

1. (b) the rats in South Carolina in August 1956

2. 2.66/sq yards

3. 1 per yard^2 per year

4. (1) eye piece

   (2) course adjustment

   (3) fine adjustment

   (4) arm

   (5) high power objective

   (6) stage

   (7) tube

   (8) mirror

   (9) base

   (10) diaphragm

5. Your list should include at least three of the following:

   weather

   available food supply

   proper habitant (living space)

   the density of population

   other organisms

Answer Key to Self Test Section II

1. a

2. any of the following

   nutrient supply

   natality

   mortality

   immigration

   emigration

   other organisms

   (there may be others, if you have others see the teacher)

3. different

4. reproductive isolation

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LEARNING

ACTIVITY

PACKAGE

COMMUNITIES

AND

ECOSYSTEMS

Ninety Six High School - Ninety Six, S.C.

BIOLOGY 103-104

LAP NUMBER 13

REVIEWED BY J.S.R.

WRITTEN BY B.L. Rhodes

51772

3

Rationale

In our last LAP we studied how organisms are affected by environment factors such as food, space and density. We also learned that individuals are often studied as a population.

In this LAP we will see that populations of different species interact with one another and how a small change in one population can cause the entire community to change.

Just as populations are a part of the community, communities are part of larger relationship which we will explore in the next LAP.

Section I Energy for Life

Behavioral Objectives

Level I.

1. From a given list, you will choose those which are forms of chemical energy.
2. Describe how producers differ from consumers in obtaining energy.
3. Demonstrate your understanding of a given energy pyramid by choosing the correct written statements concerning the diagram.
4. You will be able to construct a diagram of the following: water cycle, calcium cycle, carbon cycle. You will label all major factors involved in the cycle.
5. From a given list you will be able to choose those which are foods.
6. From a given list of organisms you will be able to construct a food web.
7. From a given food web you will be able to tell which organisms are producers, 1st, 2nd., or 3rd in order consumers.
8. From a given food web you will be able to identify an organism as herbivore, carnivore or saprovore.
9. Given a list of organisms and a description of their relationships you will (1) construct a food chain (2) predict what effect a given change in the food chain would produce.

Level 2

1. Determine what effect if any a given situation would produce in a water, carbon and/or calcium cycle.
2. Be able to demonstrate your understanding of the word biosphere by writing a short paragraph on its meaning.
3. Be able to demonstrate your understanding of the nitrogen cycle by drawing a diagram of the cycle and labeling all steps and/or by writing a brief paragraph describing the major steps.
4. From a given food pyramid you will be able to form generalizations about the relationship of the parts to each other and to the whole.

Resources

Readings and Problems

1. B.S.C.S. (green version) pp. 18-31
2. Biology Introduction to Life Nason/Goldstein pp. 704-717.
3. Foundations of Life Science-Jremp pp. 201-204, 216-225
4. Biology Smallwood pp. 657-660
5. Life and the Molecule (14.1) pp. 362-379
6. Fauna vol. 1 "Desert Encounter" p. 17-19
7. The web of life 19.20 pp. 19-24
8. Ecology Life, 574.5 pp. 35-44

Visuals:

Audio Booklet - # 13-1

Nature's Cycles, F.S.

Depth Study

After selecting a plot near your home, observe the area for at least 15 minutes each day for one week at the end of that time construct a food web involving the organisms that you observed. Include several organisms on each food level.

Self Test Section I

1. Choose the ones which are examples of chemical energy

   (a) electric current

   (b) steam generator

   (c) burning gas

   (d) water falling

2. From which of the following does a producer directly obtain energy.

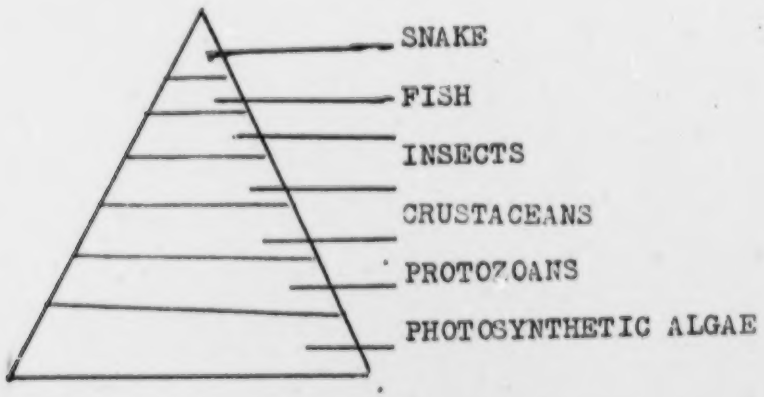
   (a) plants

   (b) water

   (c) soil

   (d) sun

Questions 3 and 4 are taken from the following diagram.



3. According to the energy pyramid the most abundant organisms are

   (a) protozoans

   (b) photosynthetic algae

   (c) snakes

   (d) none of the above

4. If fish were removed from the pyramid which of the organisms would probably be the first to increase?

   (a) protozoans

   (b) photosynthetic algae

   (c) snakes

   (d) insects

5. Which of the following links in the water cycle is responsible for converting carbon dioxide (CO_2) into organic compounds?

   (a) decay

   (b) respiration

   (c) photosynthesis

   (d) all of the above

Section II Ecological relationships in the Biotic Community

Behavioral Objectives

After consulting the resources you will be able to:

10. Show your understanding of the meaning of the following words by choosing their correct definition from a given list.

taxonomy	host
ecology	succession
predator	niche
prey	symbiosis
parasite	

11. Choose whether a given symbiotic relationship is an example of commensalism, mutatism, parasitism or predation.

12. Identify examples of interspecific competetion or intraspecific competetion from a given list.

Level 2

Describe in writing the steps in the succession of a pond from its pioneer stage to the climax. Include the factors which caused the major changes in its succession.

Resources

Readings and problems

1. B.S.C.S. Green pp. 72-76, 83-97
2. Biology introduction to life (#14.1) pp. 718-732
3. Biology silver Burdett (# 19.13) 664-675
4. Ecology Life 745.5 chapter 5 pp. 55-104

Visuals

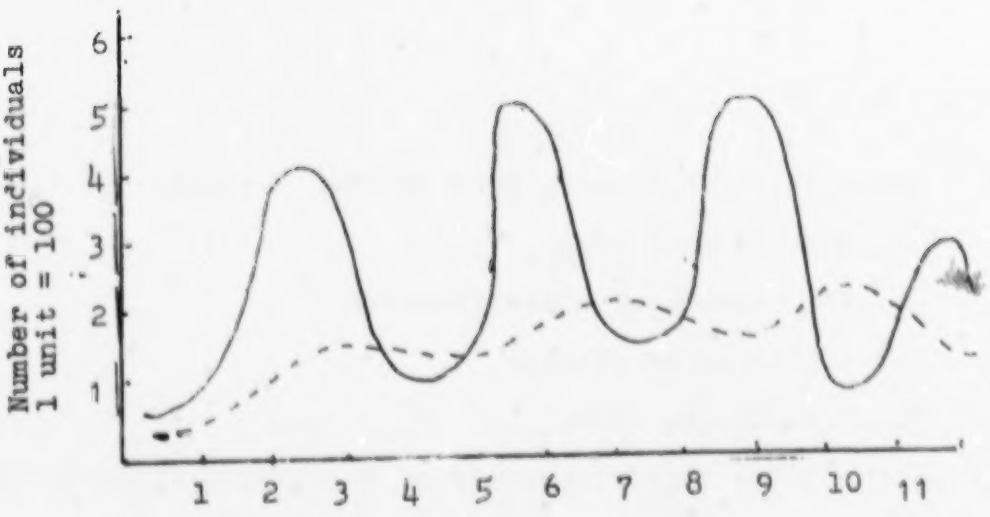
F. S. "Symbosis"

The Pond How living things change their environment F.S.

Depth Study See teacher for assignment.

Self Test II

1. Which of the following best defines taxonomy
   (a) the study of taxes
   (b) the science of classification
   (c) the study of planets
   (d) none of the above
2. Which of the following would be an example of mutualism.
   (a) two different organisms living together one is benefited but the other is not affected.
   (b) two different organisms living together both are benefited.
   (c) one organism feeding on another
   (d) none of the above
3. The competition between crows for available nesting sites is an example of
   (a) mutualism
   (b) interspecific competition
   (c) intraspecific competition
   (d) commensalism
4. From the graph on the next page it could be concluded that population
   (a) x and y are predators
   (b) y is the prey and x the predator
   (c) x is the prey and y the predator
   (d) x and y are prey



5. Which of the following are not foods for any form of animal

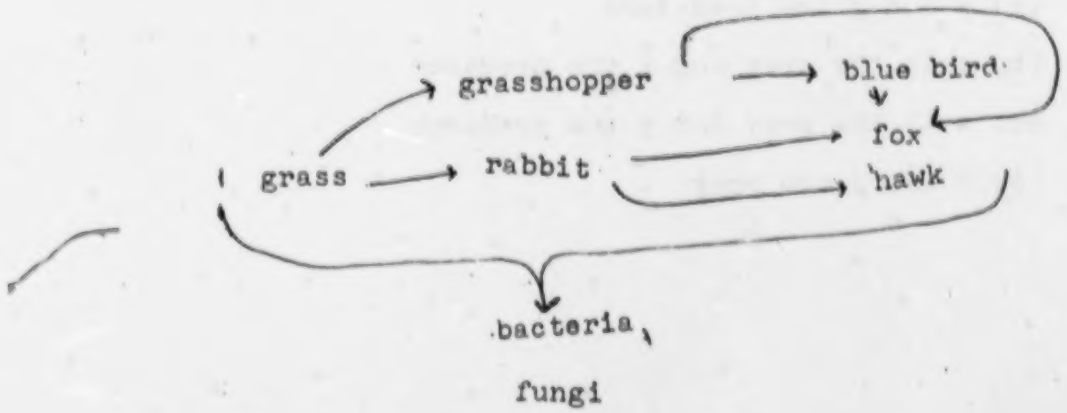
(a) water

(b) protein

(c) fat

(d) sugar

Questions 6-9 are based upon the following diagram



6. From the above diagram which of the following are <u>not</u> 1 st. order consumers.

   (a) rabbit

   (b) bacteria

   (c) grasshopper

   (d) fox

7. If the grasshoppers population suddenly decreased, the blue bird population would most probably

   (a) increase (c) remain constant

   (b) decrease (d) none of the above

8. In the diagram the organisms which are herbivores are

   (a) grasshopper, rabbit, and fox

   (b) rabbit only

   (c) hawk and fox

   (d) grasshopper and rabbit

9. From the food web, which organisms depend upon the grass either directly or indirectly

   (a) grasshopper, rabbit, bacteria, fungi

   (b) grasshopper and rabbit

   (c) grass only

   (d) all except grass

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LAP

LEARNING
ACTIVITY
PACKAGE

DIVERSITY

Ninety Six High School
Ninety Six, S.C.

BIOLOGY 103-104

IEWED BY

LAP NUMBER 15

WRITTEN BY Bruce Rhoden

32772

5

RATIONALE

In our previous studies, we have observed that living things do not and cannot exist independently of one another. We have examined some of these relationships in a general way. Before we can study organism and their relationship in any greater detail, we must be able to identify the kinds of organism we might find. In this LAP, we will become familiar with the major group of plants, animals and protist. We will also discover how it is possible to identify the organism from a seemingly endless supply of life forms. This study will then make it possible to study the ecological relations of the land and water communities with more understanding.

Section I

Principals of Classification

Behavioral Objectives:

1. After consulting the resources, you will be able to compare the classifaction system used during Aristotles' time to the modern system, including differences in the characteristics used then as contrasted to those used now.
2. From a given list, you will choose the charateristics which are used to classify living organisms in a modern system of taxonomy.
3. List in order from the largest group to the smallest the seven major levels used in biological classification. Include both singular and plural forms.
4. Given the name of one of the seven major levels in the classification system, you will identify
   (1) the next larger grouping level
   (2) the next smaller grouping level
5. Describe in writing why you could find some organism listed in one group in one text and in another group in some other text.
6. List three advantages of using scientific names over common names for organisms.
7. Identify from a given list of scientific names the ones which belong to the same genus and/or species.
8. List at least three characteristics that any good classification system have in common.
9. List two contributions of Linnaeus to the science of taxonomy.

10. Choose the phylum and/or class to which a given animal belongs. The animals will be ones which are familiar or they will be described in such a way as to identify the group.

11. Distinguish between bilateral and radial symmetry by choosing from a list those organisms which have bilateral symmetry and those that have radial symmetry.

12. Show your understanding of the terms posterior, anterior, dorsal and ventral by identifying these areas from a given diagram.

Level II:

Demonstrate your understanding of the problems to be overcome in classifying organisms by writing a brief explanation of some of the problems.

Level II:

Demonstrate your understanding of the principals of classification by writing a description of the goals to be achieved in constructing a "natural" system of taxonomy.

Resources

Readings and Problems

1. Life, it's forms and changes (2.18.1) pp. 224-229
2. High School Biology, pp. 104-108
3. Biology, Silver Burdett, pp. 239-253
4. A Guide to the Natural World - Life Nature Library, pp. 11-16
5. Foundations of Life Science, pp. 38-52
6. Life and the Molecule, pp. 151-159
7. Patterns and Process, p. 5 (8)
8. Living Things, p. 144.

Visuals

Classification Chart - Hamlont

Classification Characteristics, F. S.

Laboratory

High School Biology, "The Levels of Classification" pp. 108-113

Depth Study

After reading "Numerical Taxonomy", Scientific American Offprint #1059, pp. 2308-2318, you will have a discussion on its contents with the teacher to evaluate your understanding of the material.

Self Evaluation Test - Section I

Choose the one best answer:

1. The basis of Aristotles' grouping system was:

   (a) size

   (b) color

   (c) physical characteristics

   (d) place they lived

2. Which of the following is the more important characteristic to be used in a modern system of taxonomy?

   (a) habitat

   (b) mode of locomotion (way they move)

   (c) way they reproduce

   (d) common ancestry

3. From the following list, the one which is out of order is:

   (a) order — kingdom, phylum, order, class, family, genus, species

   (b) genus

   (c) phylum

   (d) kingdom

4. Classes which have characteristis in common are grouped into the same:

   (a) genus

   (b) class

   (c) phylum

   (d) order

5. The advantage of a four kingdom system over a two kingdom system is that a four kingdom system

   (a) is more correct

   (b) distinguishes more differences

   (c) is more complex

   (d) is easier to learn

6. One advantage of using Latin as a bases for scientific names is that Latin

   (a) is studied by all scientists

   (b) is easier to learn than Russian

   (c) does not change in meaning

   (d) sounds more educated than other languages

7. Which of the following belong to a different genus than the others?

   (a) Homo erectus

   (b) Hemo habiticus

   (c) Herme erectus

   (d) Homo sapien

Section II

Animal Diversity

Behavioral Objectives:

13. After referring to the resources, you will be able to list the characteristic that organisms, included in each of the following groups, have in common.

    (1) Phylum chordata

    (2) Subphylum vertebrata

    (3) Class Mammals

    (4) Class aves (birds)

    (5) Class Reptiles

    (6) Class Amphibians

    (7) Class Osteichthyes

    (8) Class chondrichthyes

    (9) Phylum arthropods

    (10) Class insects

    (11) Class araehnids

    (12) Class crustaceans

    (13) Phylum annelid

    (14) Phylum mollusks

    (15) Phylum echinoderms

    (16) Phylum rotifers

    (17) Phylum roundworm (nematodes)

    (18) Phylum flatworms (platyhelminthes)

    (19) Phylum coelenterates

    (20) Phylum sponges (porifera)

14. Based upon your knowledge of the characteristics of the above groups, identify the group or groups to which a given specimen or illustration of a specimen belongs.

Level II: You will demonstrate your understanding of animal taxonoms by correctly identifying the phylum ofeight out of ten animals you have not previously seen.

Resources

Reading and Problems:

1. B. S. C. S. (Green), pp. 113-138, Appendix II, p. 782
2. Biology, Silver-Burdett, pp. 269-283
3. Life and the Molecule, pp. 201-221
4. The Fish
5. The Birds
6. The Mammals

Life Nature Library (these books are for your enjoyment. You do not have to read all the material they contain).

7. A Guide to the Natural World, pp. 18-21, pp. 38-81

Visuals:

1. "Animal Diversity", slide tray and cassett
2. Preserved and labeled specimens
3. "The Classification of Animals", F. S. Series #1, 2, 3, 4, 5, 6 and 7.
4. "Fantastic Creatures", study prints

Laboratory:

1. High School Biology, "Structural Characteristics in the Identification of Animals", pp. 139-142

Depth Study: See Teacher

TAKE PROGRESS TEST

Self Evaluation Test - Section II

1. List the characteristics that all the organism included in the following groups have in common.

   Phylum chordata

   Class osteichthyes

   Class chondrichthyes

   Phylum rotifers

   Phylum coelenterates

2. List the group to which each of the following belong.

   a. sea anemone -

   b. sponge -

   c. tapeworn -

   d. trichina worm -

   e. clam -

   f. grasshopper -

   g. spider -

   h. sea urchin -

   i. amphioxus -

   j. seahorse -

Section III

Plant Diversity

15. After referring to the resources you will be able to identify the major parts of an angiosperm flower from a given diagram of a flower, which contains one or more of the parts.

16. Identify the definition of the following words:

    (a) perennials

    (b) annuals

    (c) cotyledon

    (d) hyphae

17. Identify a given angiosperm as a "monocot" or as a "dicot," given a plant or major identifying part of a plant.

18. List the major structural differences between an angiosperm and a gymnosperm.

19. Identify the following from a given specimen of representation of a specimen:

    (a) a fern

    (b) a bryophyte (moss)

    (c) a liverwort

    (d) a fungi

    (e) an algae

20. Explain how algae differ from fungi in obtaining energy.

21. Describe the symbiotic relationship that exists in lichens.

Level II:

Form several hypothesis on why angiosperms are better or more abundant than bryophytes.

Level II:

Describe the structural characteristics that limit algae to moist environments.

Resources

Readings and Problems:

1. B. S. C. S. (Green version), pp. 157-182
2. Biology, Selver Burdett, pp. 365-267
3. B. S. C. S. (Blue version), pp. 56-58
4. Foundations of Life Science, pp. 697-699
5. Life and the Molecule, pp. 182-197

Visuals:

Micro. Slide: (1) Root, monocots and dicot, CS

Film strips: Plant Classification

Mounts: Plant Kingdom, herberium specimens

Slides and Cassett: Plant Diversity

Laboratory:

GET LAB HANDOUT #14-3 FROM TEACHER.

Activities:

(1) Guide question p. 184, #2,3,5,8,9,16

(2) Problems p. 184, #2 and 3.

Depth Study:

You will be able to classify at least 10 plants representing at least 5 different phyla using a taxonomic key. You will correctly classify on all major levels down to and including the species.

Self Test - Section III

1. Using the model of an angiosperm flower, name the parts to the instructor.

2. Define the following words:

   (a) Perennial -

   (b) Hyphae -

   (c) Cotyledon

3. List three characteristics of a monocot which differentiates it from a dicot.

   (1)

   (2)

   (3)

4. List two characteristics which distinguish an angiosperm from a gymnosperm.

   (1)

   (2)

5. Describe the symbiotic relationship that exists in a lichen.

Section IV

Protist Diversity

Behavioral Objectives:

After referring to the resources, you will be able to:

22. Demonstrate your understanding of classification by sighting at least two examples in which organisms are classified as protist in the three kingdom system but in the monera kingdom in the four kingdom system.
23. Describe the characteristics of blue-green algae which makes them different from other algae.
24. Identify a given protist as a

    (1) Flagellate
    (2) Amebae
    (3) Ciliate
    (4) Sporozoan

25. Describe the living and non-living characteristics of virus.
26. Demonstrate your ability to correctly and safely culture bacteria and to determine the density of microbal populations by culturing given species of non-pathogenic bacteria to the specifications described by the instructor.
27. Demonstrate your ability to obtain a pure culture of bacteria by isolation and filtering one type of bacteria from a culture containing a number of different types. The degree of correctness will be determined by how well you followed the prescribed microbal technique.
28. After reading "The Microbe Enemy", Life reprint #28, you will be able to list at least four diseases caused by virus and three caused by bacteria.

Resources

Reading and problems:

1. "The Microbe Enemy", Life reprint #28.
2. High School Biology, B. S. C. S. (green version), pp. 186-209.
3. Biology, Silver Burdett, pp. 258-263.
4. Life and the Molecule, pp. 161-177

Visuals:

Slides and Cassett: Protist Kingdom

Micro Slides:

Filmstrips:

(1) "The Virus", Popular Science #1528

(2) "Bacteriological Technique"

(3) "Working With Micro-Organisms", Film 1-OOP

Laboratory:

"Microbial Techniques": Populations (B. S. C. S. green version), pp. 194-197

SEE YOUR INSTRUCTOR ABOUT LAP TEST.

Section IV

Self Test

1. List organisms which are grouped in the protist kingsom in a three kingdom system and in the monera in a four kingdom system.

   (1)

   (2)

2. In what way do blue-green algae differ from the other algae?

3. List one organism in each of the following groups:

   (1) Sporozoans -

   (2) Ciliate -

   (3) Flagellate -

4. List two diseases caused by virus:

   (1)

   (2)

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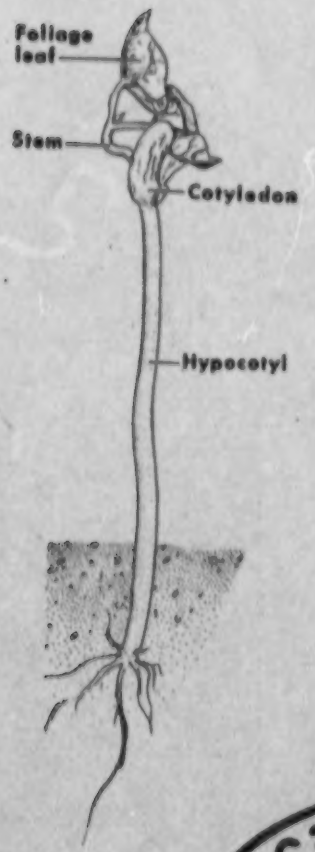
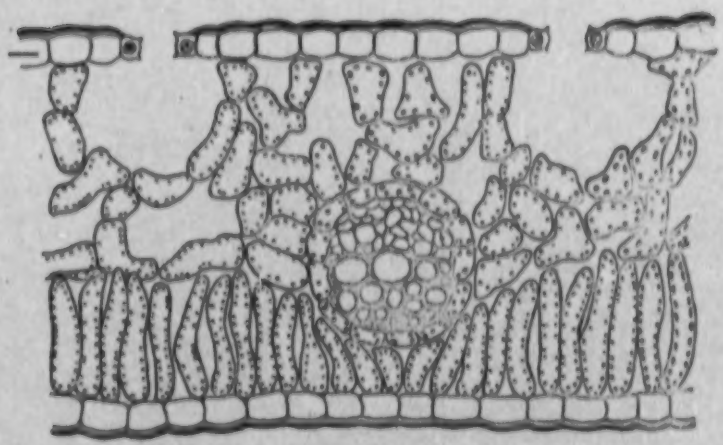
LEARNING ACTIVITY PACKAGE





PLANT FUNCTIONS

Ninety Six High School - Ninety Six, S.C.

BIOLOGY 103-104

LAP NUMBER 17

WRITTEN BY B. E. Rhoden

VIEWED BY

Rationale

We have been studying the individual and how it interacts with other individuals of the same species, other populations and its environment. The cell is the individual unit of the organism and it also has complex interactions with other cell populations in order to maintain the balance within the individial. In this LAP we will study the ways in which the individual functions to maintain its existence. In the next LAP we will study the functions of animals and learn how the organs interact for the survival of the species.

Section I Leaves, Roots and Stems

Behavioral Objectives:

1. You will collect, press, mount and label as to species at least six leaves differing in general structure as much as possible. (2) (3)
2. Given a leaf or drawing of a leaf you will identify the following external structures if present. (1a)
   (a) blade (b) petiole (c) margin (d) viens
3. Given a drawing or a microscope slide showing the internal structure of a leaf you will identify the following and describe their function. (1b) (20-1) (20-2)
   (a) upper epidermis (b) mesophyll (c) lower epidermis (d) stomate (e) guard cell
4. Identify the structural characteristics of roots that perform the functions of storage, absorption and anchorage. (1-b) (4-c) (5)
5. You will describe the structural characteristics which is used to distinguish between a root and a stem. (1-b)
6. From a given stem or drawing of a stem you will identify and give the major function of the following external structures. (1-b_ (4-b)
   (a) terminal bud (b) lateral bud (c) scale scar (d) lenticels
7. You will describe the characteristics and functions of the following plant tissue. (1-b) (4-b) (4-c) (5a) (20)
   (a) pith (b) cambrium (c) xylem (d) phloem
8. Based upon your knowledge of conduction of water in vascular plants you will be able to explain: (1-b) (6) (7)
   the "Transpiration-Tension" theory for the rise of liquids in plant stems.

Resources I

Readings:

1. High School Biology B.S.C.S (a) pp. 443-448 (b) pp. 451-465
2. "Common Trees and their Leaves" Audulion Nature Bulletin
3. The Trees H. E. Jaques
4. Life its Forms and its Changes (a) pp. 130-134 (b) pp. 135-142 (c) 143-152
5. Biology Introduction to life (a) pp. 292-299 (b) pp. 306-313
6. Biology Silver Burdett pp. 403-409
7. Biological Science pp. 304-308

Visuals:

20. Microscope slides
    1. Epidermis dicot leaf
    2. Lilac leaf C.S.
    3. Root
    4. Clover Stem
    5. Ranuncolus stem
    6. Leaves monocot and dicot
    7. Roots- monocots and dicot
21. 2 x s slides
    1. Root lip # 93
    2. Dicot Stem # 95
    3. Epidermis of onion leaf # 96
    4. Corn leaf # 97
    5. Dicot leaf # 98

Handouts:

30. Root types

A C T I V I T I E S I

1. Answer the following questions on page 474-475 of High School Biology B.S.C.S. (write the questions)

   # 2, 3, 5, 6, 9, 12, 13

LABORATORIES

Investigation 13-2 part A High School Biology pp. 450

Self-Evaluation

1.

Label the leaf as indicated

2. Briefly describe the function of the following cellular structures.

   (a) mesophyll

   (b) stomate

   (c) upper epidermis

3. Describe the major function of the root hairs.

Section II Plant Growth

9. You will be able to describe how meristem tissue differs from other plant tissue in respect to growth. (1)

10. You will be able to list the areas in vascular plants where meristematic tissue is found. (2b) (1)

11. You will describe how growth in plants is different from growth in animals. (1)

12. You will be able to demonstrate your understanding of phototropism and the functions of auxens by correctly choosing the best prediction to a given hypothesis. (1) (2a) (5b)

    Example: If a piece of mica is inserted partically through a coleoptile and exposed to light on the opposite side then.

    (a) the coleoptile would bend toward the light

    (b) the coleoptile would bend away from the light

    (c) the coleoptile would not bend.

    (d) the coleoptile would die

13. You will distinguish between the following positive and negative phototropism , phototaxis and geotropism . (1)

Resources II

Readings:

1. High School Biology, pp. 465-470
2. Biology Silver Burdett (a) 465-470 (b) 516-517
3. Foundation of Life Science (a) 5-8, 512

Laboratory:

1. Rate of Growth High School Biology p. 470

A C T I V I T I E S

1. Problems on page 475 of High School Biology # 5,6,7, and 8. Will Be Graded.

Self-Evaluation II

1. Discuss the difference between the following in terms of processes and responses.

   (a) geotropism and geotaxis

   (b) phototropism and phototaxis

   (c) negative and positive phototropism

2. In what ways do auxin affect plant growth?

3. Describe the ways in which plant growth differs from animal growth.

4. List the area on a plant where meristematic tissue can be found?

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LAP

LEARNING ACTIVITY PACKAGE

ANIMAL FUNCTIONS

Ninety Six High School
Ninety Six, S.C.

BIOLOGY 103-104

IEWED BY

LAP NUMBER 18

WRITTEN BY Mr. Rhoden

RATIONALE

Studying the structures of animals and the specific functions of these structures is important to our understanding of how the various organism are able to cope with the various problems to be overcome in order for organisms to survive. The study of biology on a first year level demands that we make comparisons of how the various animals handle the problems of survival. In order to make such comparisons we will study several animals from the relatively simple earthworm to the more complex vertebrates. From this study we will continue with the study of reproductive patterns of organisms.

Lap 18 - Animal Functions

Biology 103 - 104

BEHAVIORAL OBJECTIVES:

After referring to the resources and activities, you will be able to:

1. List the characteristics of the phylum and class to which the organisms you are studying belong. (6) (7)
2. Determine whether the specimen has bilaterial or radial symmetry.
3. Demonstrate your understanding of the correct disection procedures by following such procedures in all disections. (1) (7)
4. Identify the anterior, posterior, dorsal, and ventral areas of a given preserved earthworm. (7)
5. Identify the following external structures of an earthworm from a preserved or drawn specimen. (1) (3) (7)

Prostomium	Semenal grove
Mouth	Seta
Clitellum	Anus
Vasa deferentia	Cuticle

6. Identify the following internal structures from a preserved specimen or a drawing of such a specimen of an earthworm. (1) (3) (7)

   Septa

   Coelom

7. Discuss the flow of food through the digestive system using the following terms in your discussion. (1) (3) (2) (7)

Pharynx	Gizzard
Esophagus	Intestine
Crop	Anus

8. Indicate the location of the following structures in the internal disection of a preserved earthworm or a drawing of a disected earthworm. (1) (2) (3) (4) (5) (7)

8. con't

Ventral blood vessel	Seminal receptacles
Dorsal blood vessel	Brain
Hearts (how many?)	Nerve cord
Seminal vesicles	Nerve ganglion

9. Label the parts listed below on a drawing of an earthworm <u>cross section</u>. (2) (3) (7) (8)

1. nerve chord
2. ventral blood vessel
3. dorsal blood vessel
4. setae
5. cuticle
6. longitudinal muscles
7. circular muscles
8. intestine

RESOURCES

Readings and Problems:

1. Earthworm dissection handout
2. Biology test sheet handout
3. Earthworm anatomy handout
4. Biology - Silver Burdett (a) 391-393
   (b) 368-369
   (c) 487-488
5. Life and the Molecule - Navarra - pp. 210-212
6. Biological Science, Molecules to Man; pp. 59-63

Visuals:

7. "The Earthworm" F. S.
8. Slides - "Earthworm Ovary"
9. "Jurica" Chart - Earthworm

ACTIVITIES

The following are the activities which are required for completing the section.

1. Review the filmstrip "Earthworm" disection before beginning your disection of the earthworm.
2. Fill in and turn in the worksheet "Earthworm".
3. Fill in the cross sectional drawing with the parts from Objective #9.

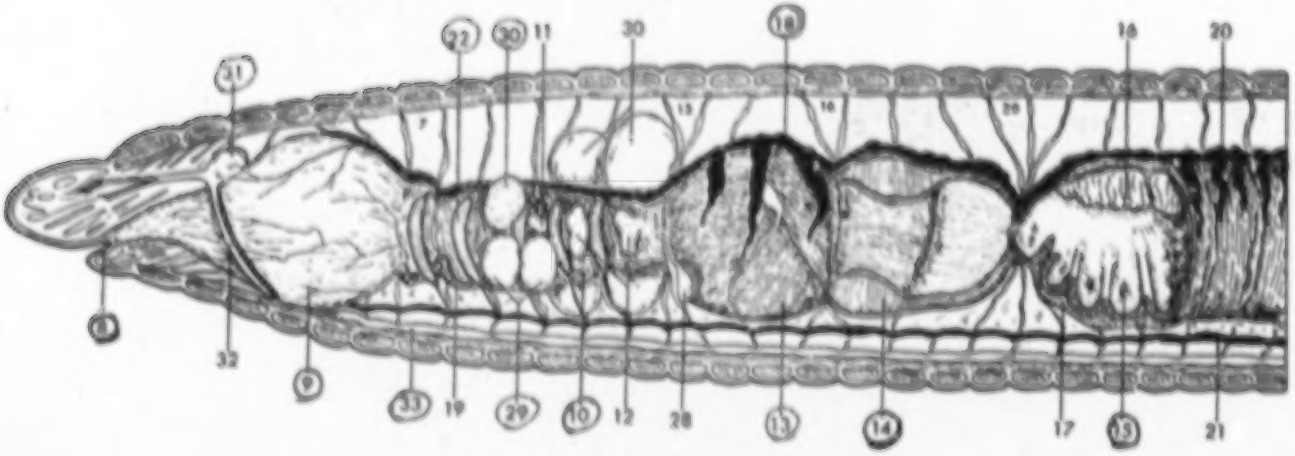
Self-Evaluation Test

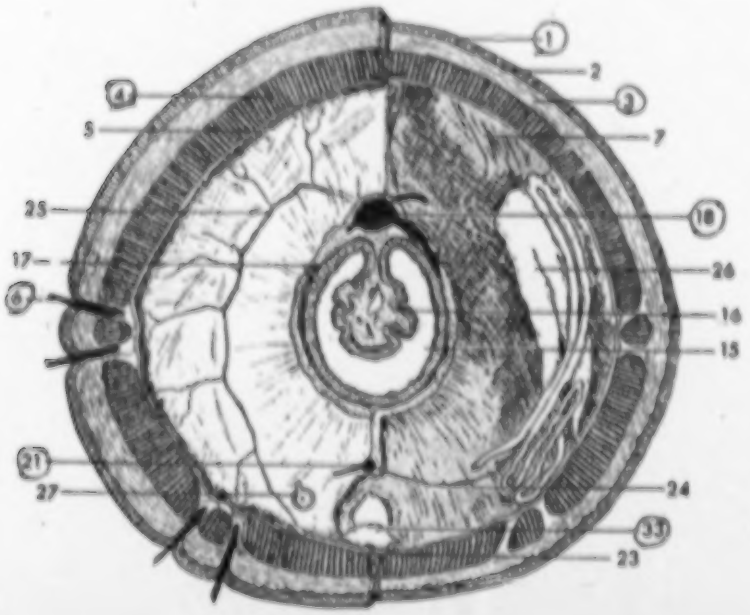
1. Get the dissection tray prepared by the teacher and number on a piece of paper from 1-10. Label the parts in which the pins are stuck in the dissected earthworm. (Answers at end of Lap)

2. Label the structures which are indicated by the <u>circled</u> numbers.

EARTHWORM ANATOMY

1. General





Take Progress Test. Progress Test will be given as a laboratory practical.

Answers to Self-Evaluation Test.

1. Cuticle
2. Epidermis
3. Circular muscles
4. Longitudinal muscles
5. Peritoneum
6. Seta
7. Coelom
8. Mouth
9. Pharynx
10. Esophagus
11. Esophageal pouch
12. Esophageal glands
13. Crop
14. Gizzard
15. Intestine
16. Typhlosole
17. Chlorogogen cells
18. Dorsal vessel
19. Lateral esophageal vessel
20. Intestinal vessel
21. Subintestinal vessel
22. Heart
23. Subneural vessel
24. Nephridial vessel
25. Parietal vessel
26. Nephridium
27. Nephrostome
28. Ovary
29. Seminal receptacle
30. Seminal vesicles
31. Suprapharyngeal ganglion (Brain)
32. Nerve collar
33. Ventral nerve

Section II

BEHAVIORAL OBJECTIVES:

Depending upon the animal you select to dissect, you will be able to complete the behavioral objectives under your section after referring to the resources.

10. You will be able to describe the major functions of all structures which have a star beside them, given a preserved specimen or a drawing including the structure.

FROG

External Structure

11. From a given preserved frog or a drawing of the frog, you will be able to indicate the following external and mouth cavity structures. (1) (4)

external nares	maxillarys teeth
tympanum (ear)	*vomerine teeth
*cloaca	internal nares
tongue	*glottis
pharynx	eustachean tubes

General internal structures

12. From a given preserved frog or a drawing, you will be able to locate the following structures. (1) (4)

viscera	gall bladder	fat bodied
coelom	*small intestine	*ovaries or
pectoral girdle	*large intestine	*testes
heart	spleen	cloaca
lungs	pancreas	*stomach
*liver	*kidney	

13. You will be able to trace the path taken by food through the digestive system from the oral cavity to the anus. Given a preserved frog, a drawing or the internal structure, you will name the organs through which the food passes in order. (1) (4)

14. After you study the structures and functions of the frogs, you will be able to compair the structures of earthworm, frog and man, including the following points: (1)

    (a) ways in which the following systems are alike and ways in which they differ.

14. con't

digestive

circulatory

reproductive

(b) Why the earthworm would be considered "simpler" than the frog and man.

SHARK

After consulting the resources, you will be able to:

15. Demonstrate your use of correct dissection procedure by following the directions exactly as given. This will be evaluated by the instructor during your lab work. (5)

External structures of shark

16. Locate the following structures on a preserved shark or a drawing containing the structures. You will be able to give the main function of the ones with a star beside them. (5)

(a) spiracle*	(f) pectoral fin
(b) eyes	(g) pelvic fin
(c) gill slits	(h) nostrils
(d) dorsal fins	(i) mouth
(e) caudal fin	(j) cloaca*

Internal structure of the shark

After consulting the resources and activities, you will be able to:

17. Describe how the teeth of a shark are adapted to the eating habits of the shark. (5)

18. Identify the location of the following organs on a given preserved shark or a drawing containing the structures. You will give the major function of the ones which have a star beside them. (6)

mouth	spleen	pancreas
pharynx	duodenum	ileum
esophagus	liver*	rectum
stomach	gall bladder	cloaca
		ovaries or testes*

S H A R K

19. You will trace the flow of blood through the heart; gills and out into the body, naming the major vessels and heart chambers through which the blood passes.

20. You will compair the circulatory system in the shark to that found in the earthworm and in mammals in respect to the following:
    (a) Major differences in structure
    (b) Adaptive advantages of each

BEHAVIORAL OBJECTIVES:

The external and digestive structures of the cat.

After consulting the resources and activities, you will be able to:

21. Locate the following structures from a preserved cat or a drawing of a cat containing the structures.

hair
nipple
retractable claws
lips
teeth
  incisors*
  canines*
  premolars*
  molars*

pharynx
esophagus
stomach
pancreas*
liver
small intestine
  duodenum
  jejunum
  ileum

large intestine
  ascending colon
  transverse colon
  descending colon
cecum
rectum
anus

22. Trace the flow of blood from the body through the heart and lungs and back into the body on a preserved cat or a diagram of the cat's circulatory system. You will identify the following structures through which the blood passes.

heart
auricles
lungs
ventricles
dorsal aorta

23. Locate and identify the following structures of the urogenital system from a cat specimen or a diagram of a cat containing these structures.

kidneys*
bladder*
ureters*
urethra*

ovaries*
oviducts
umbilical cord
] female

testes*
scrotum
spididymis*
epididymis*
was deferens*
seminal vesecles*
urethra
] male

24. Compare the structures found in the cat's digestive and reproductive system to the digestive and reproductive system of the earthworm, and frog. Your comparison should include such things as the ways they are alike and different and the advantages of one over the others.

ACTIVITIES

Frog

1. Complete circled numbers on Biology test sheet T47.
2. Complete circled numbers on Biology test Sheet T49.
3. Label the "Digestive System of Frogs" Handout.

Shark

1. Answer the following questions on IV "questions on the body cavity", #1, 2, 3, 5, 8, 9.
2. Using diagram V "The Alimentary Canal and Adjacent Organs". Label all organs on the drawing that are in your Objectives.
3. Using Diagram I "general external structure of embryo", label the indicated fins.

Cat

1. Specific activities will be given to you at the time of the lab.

Resources II

F R O G

Readings:

1. Biology, Silver Burdett (a) pp. 524-526(reproductive system)
   (b) pp. 420-421(respiratory system)
2. Biology, Introduction to Life, p. 369 (heart)
3. Life, "Its Forms and Changes", pp. 97-102 (good pictures)
4. "Laboratory Guide on Dissecting Frog"

Visuals:

20. "The Frog" fs. dissection
21. "Jurica Chart" Frog

Handouts:

30. Bioreview Sheets on frog anatomy

S H A R K

Readings:

1. "Sex determination in Sharks" fish life vol. 4.
2. Life an Introduction to Biology, (a) pp. 312-313
   (b) pp. 605-606

Visuals:

Handouts:

30. Broreview Sheest Shark Anatomy
31. Lab guide to the dissection of shark

C A T

Readings:

1. Biology, Johnson p. 169 (circulation)

Visuals:

20. Bioreview Sheets cat anatomy

Handouts:

30. Laboratory guide